

EVOARTIST: CREATING ABSTRACT ARTISTS USING INTERACTIVE EVOLUTIONARY COMPUTING

Joel Berghoff – University of Oregon

1. Abstract

Real-world artists use a wide variety of techniques and tools to create their art. Compositional guidelines like balance, focal points, perspective and color theory are commonly employed in an effort to create an aesthetically appealing piece of art. Artistic boundaries are pushed when these guidelines are bent or broken.

EvoArtist is an application that uses interactive evolutionary computation to allow users to create virtual artists. These 'evo-artists' create 'paintings': pieces of art whose qualities are determined by the artist's 'genes.' Its genes may lead the evo-artist to follow compositional guidelines or ignore them completely.

Evo-artists are evaluated subjectively by the end user based on the aesthetic appeal of the pieces the evo-artist produces. The end user only needs to know whether he or she likes the pieces produced: The genetic makeup of the evo-artists need never be revealed. Evo-artists can then be 'mated' to produce new evo-artists that potentially combine the preferred genes of their parents. Successive generations of evo-artists will ideally produce pieces of art of increasing aesthetic appeal to the user.

The genes that define an evo-artist help produce a wide variety of paintings. Due to the variability of individual genes (see the 'Genes' panel to the right) an individual evo-artist can create a portfolio of similar-looking paintings or a wide variety of types of paintings. For instance, an evo-artist's palette may be restricted to a few shades of one color or may only be constrained by the limits of 24-bit RGB (red, green, blue) colors.

2. Genes



Shape Genes

In this application, evo-artists use shapes as their primary artistic element. Shapes include lines, filled and unfilled rectangles, filled and unfilled ellipses, and filled 'polygons' (other multi-sided shapes). Genes help determine how many of each shape is used and the range of sizes of each shape.

Compositional Genes

Specific genes determine whether or not an evo-artist will strive for vertical and/or horizontal balance in each painting. Balance is achieved when a proportionate area is covered on each side of a painting. Other genes determine the ratio of these sides.

For example, genes may dictate that the evo-artist strives for 'classical' horizontal balance by placing as much subject matter on the left half of the piece as the right. Another evo-artist's genes may lead that evo-artist to paint 7/10 of the subject matter in the left 7/10 of the piece and 3/10 of the subject matter in the right 3/10 of the piece.

Color Palette Genes

Genes determine a color palette for each evo-artist. One gene determines how many of the colors in their palette are used. Evo-artists typically have individual genes for six different colors plus a separate gene that determines the color of the canvas the evo-artist uses.

Variability Genes

Every gene has a corresponding *variability* gene. These genes determine how far an evo-artist can diverge from the value of given gene. For instance, shape genes may dictate that an evo-artist should add 20 polygons to each piece. The number-of-polygons variability gene, however, may allow an evo-artist to add anywhere from 10 to 30 polygons.

3. How the Program Works

